U.S. Department of Transportation

Intelligent Transportation Systems Standards Fact Sheet

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NTCIP 2104 (Draft) National Transportation Communications for ITS Protocol (NTCIP) – Ethernet Subnetwork Profile

Overview

The National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP) is a family of standards that provides both the rules for communicating (called protocols) and the vocabulary (called objects) necessary to allow electronic traffic control equipment from different manufacturers to operate with each other as a system. The NTCIP is the first set of standards for the transportation industry that allows traffic control systems to be built using a "mix and match" approach with equipment from different manufacturers. Therefore, NTCIP standards reduce the need for reliance on specific equipment vendors and customized one-of-a-kind software. To assure both manufacturer and user community support, NTCIP is a joint product of the National Electronics Manufacturers Association (NEMA), the American Association of State Highway and Transportation Officials (AASHTO), and the Institute of Transportation Engineers (ITE).

The NTCIP family of standards is a joint project of the following standards development organizations:

American Association of State Highway and Transportation Officials (AASHTO)

Institute of Transportation Engineers (ITE)

National Electrical Manufacturers Association (NEMA)

(Contact information is shown at the end of this fact sheet)

Expected Publication Date: April 2003
For current information on the status of this standard, check the Web site at the bottom of this page.

Prior to the establishment of the NTCIP, traffic management centers used a number of proprietary protocols to exchange information with field devices such as traffic signal controllers and dynamic message signs. The goal of all NTCIP standards is to identify a common set of non-proprietary communications protocols that address requirements for center-to-center and center-to-field communications and promote interoperability.

What is this standard for?

This standard, **NTCIP 2104 – Ethernet Subnetwork Profile**, specifies base standards and protocols that are used to provide specific communications functions and services and requirements for specific types of coaxial cable, twisted wire pairs, and fiber-optic media operating at communication rates of 10 megabits per second. It addresses layers 1 (physical layer) and 2 (data link layer) of the Open Systems Interconnection (OSI) Reference Model (ISO/IEC 7498), a seven-layered model that describes the basic functions and services of communication protocols. It specifies the requirements for an implementation based on the functions and operation defined in the "Ethernet" family of standards. Ethernet is a type of networking technology that is used to allow a number of computers in a network to communicate with each other.

This standard references ISO/IEC standard 8802-2 (IEEE 802.2), which provides the interface requirements between layer 2 and higher layer protocols (layers 3-7) or network profiles, and ISO/IEC standard 8802-2 and portions of ISO/IEC standard 8802-3 (IEEE 802.3), which provide the definition of layer 2 services and functions. It also references ISO/IEC 8802-3, which provides the definition of layer 1 services and functions.

Who uses it?

This standard should be used by equipment manufacturers, systems integrators, and transportation agency personnel. Manufacturers and integrators should understand the specific implementation and operational requirements that it defines. Specification writers and acceptance testers can also find this standard useful, since it defines a profile implementation conformance specification (PICS). Manufacturers, integrators, and users can use this standard as:

a. A checklist to reduce the risk of failure to conform to the standard through oversight;
b. A detailed indication of the capabilities of the implementation;
c. A basis for initially checking the possibility of inter-operating with another implementation; and

d. The basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

How is it used?

This standard defines a set of requirements, or profile, for the implementation of the lower two layers of a communication protocol that operates on the peer-to-peer basis that has been traditionally associated with local area networks (LAN). As modern technologies migrate to field devices such as traffic signal and ramp meter controllers, it may be used in the primary/secondary environments that typify traffic signal controller systems. It provides a set of functions and services for state-of-the-art transportation-related devices. Its use permits high-speed exchanges of information.

Scope

This standard, **NTCIP 2104 – Ethernet Subnetwork Profile**, specifies, by referencing other standards, the communications network requirements or profile applicable to various OSI reference model layers. It provides for connectionless and connection-oriented delivery and is designed for operation in a peer-to-peer computing environment. At the data link layer, ISO/IEC 8802-2 and a portion of ISO/IEC 8802-3 are used to provide error detection, link activation and deactivation control, and notification services. At the physical layer, ISO/IEC 8802-3 defines several choices of physical media and electrical and mechanical characteristic of the media. This standard is intended for use primarily with the NTCIP 2202 – Internet (TCP/IP and UDP/IP) Transport Profile.

Related documents

To accommodate the broad scope of this standardization effort, the NTCIP standard has been divided into numerous individual standards. A detailed list of related documents is available on the **NTCIP 9001 – NTCIP Guide** fact sheet. (The NTCIP Guide is available on-line at www.ntcip.org).

IEEE Std 802-1990 – Standards for Local and Metropolitan Area Networks: Overview and Architecture

ISO/IEC 8802-2: 1998 – LANs - Part 2: Logical Link Control (ANSI/IEEE Std 802.2-1998)

ISO/IEC 8802-3: 2000 – Information Technology - LAN/MAN Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications (IEEE Std 802.3, 2000 Edition)

ISO/IEC 7498-1:1994 – Information technology - Open Systems Interconnection, Basic Reference Model

ISO/IEC TR 10000-1:1995 – Information Technology - Framework and Taxonomy of International Standardized Profiles, Part 1: General Principles and Documentation Framework

NTCIP 2202 – Internet (TCP/IP and UDP/IP) Transport Profile

NTCIP 8003 – Profile Framework

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